Miami Dade College

Course Description
STA3164 | Statistical Methods 2 | 3.00 credits
This course is for students majoring in data analytics, systems engineering, and related disciplines who require advanced skills in statistical analysis. Students will learn how to perform tests of variance, analysis of variance, analysis of covariance, regression, correlation, and non-parametric statistics. Prerequisite: STA2023

Course Competencies
Competency 1: The student will demonstrate an understanding of inferences involving variances by:
1. Stating the basic properties of the $\chi 2$-curves.
2. Using the chi-square table in performing a hypothesis test for a population standard deviation when the variable under consideration is usually distributed.
3. Obtaining a confidence interval for a population standard deviation when the variable under consideration is usually distributed.
4. Stating the basic properties of f-curves.
5. Applying the reciprocal property of f-curves and using the f-table in performing a hypothesis test to compare two population standard deviations when the variable under consideration is usually distributed on both populations.
6. obtaining a confidence interval for the ratio of two population standard deviations when the variable under consideration is usually distributed in both populations.
7. Interpreting the output from a statistical software package applied to variances tests.

Competency 2: The student will demonstrate an understanding of the analysis of variance by:
1. Stating the hypotheses for a one-way analysis of variance (ANOVA).
2. Stating the assumptions for a one-way ANOVA.
3. Constructing an ANOVA table for a one-way ANOVA when there are equal sample sizes.
4. Conducting a one-way ANOVA test.
5. Interpreting the results from a one–way ANOVA test.
6. Stating the hypotheses for a two-way ANOVA.
7. Stating the assumptions for a two-way ANOVA.
8. Constructing an ANOVA table for a two-way ANOVA.
9. Conduct a two-way ANOVA test by testing for an interaction between the two factors and, if necessary, testing for the effect from the row factor and the column factor.
10. Interpreting the results from a two-way ANOVA test.
11. Interpreting the output from a statistical software package applied to ANOVA tests.

Competency 3: The student will demonstrate an understanding of analysis of covariance by:
1. Classifying the independent variables of a response as quantitative and categorical (qualitative).
2. Comparing the relationships between the quantitative variables and at least one categorical variable.
3. Fitting regressions in the context of multiple classifications.
4. Removing bias in observational studies.
5. Increasing the precision of randomized experiments.
6. Identifying the covariates and developing a covariance model.

Competency 4: The student will demonstrate an understanding of regression and correlation by:
1. Drawing a scatter plot for a set of ordered pairs.
2. Computing and interpreting a coefficient of correlation.
3. Using hypothesis testing to find the significance of the coefficient of correlation.
4. Determining the equation of a regression line.
5. Computing and interpreting a coefficient of determination.
6. Computing and interpreting a standard error of estimate.

Updated: Fall 2024

Competency 5: The student will demonstrate an understanding of non-parametric methods by:

1. Differentiating between parametric and nonparametric statistics.
2. Stating advantages and disadvantages of nonparametric methods.
3. Performing a hypothesis test using the sign test involving two dependent samples.
4. Performing a hypothesis test using the sign test involving nominal data.
5. Performing a hypothesis test using the sign test involving the median of a single population.
6. Performing a hypothesis test using the Wilcoxon signed rank test for a population mean or median.
7. Performing a hypothesis test using the Wilcoxon rank-sum test or mann-whitney test for comparing the medians or means of two populations using independent samples.
8. Interpreting the output from a statistical software package applied to non-parametric tests of means and medians.

Learning Outcomes:

1. Communication
2. Critical Thinking
3. Computer / Technology Usage
4. Number / Data